

**Work Order ID 80116****\*80116\***

Page 1

February-10-12 10:06:21 AM

Item ID: D6104-011

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: 17-4 SS Roundbar 6.50"OD

Start Date: 10/02/2012 Start Qty: 8.00

**\*8\***

Cust Item ID:

Required Date: 24/02/2012 Req'd Qty: 8.00

**\*8\***

Customer:

Reference:

Approvals:

Process Plan: M.C.JDate: 12/02/10 Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D6104

Rev B

100

0.00

**\*100\***

PURCHASING

Purchasing

Memo

0.00

Purchasing

Issue P/O: 16168 a)Description: S.S round billet b) Ø6.50" x  
4.100" longc) Tolerance on all dimensions are +0.030"/-0.000"d) Material:  
17-4PH Stainless steele) Min UTS = 170 KSI (38 HRc) Material  
certification required

CL 12/02/10 8

110

Receive &amp; Inspect for Damage &amp; Mat'l Certs

0.00

**\*110\***

Packaging

Memo

0.00

Packaging

Ensure material certification is attached

Pup 12/2/21 (8)

120

QC6- Inspect dimensions to drawing

0.00

**\*120\***

QC

Memo

0.00

Quality Control

Ensure Material certification comply to Dwg D6104

CL 12/02/248

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 80116

February-10-12 10:06:21 AM

**\*80116\***

Page 2

Item ID: D6104-011 Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: 17-4 SS Roundbar 6.50"OD  
 Start Date: 10/02/2012 Start Qty: 8.00 **\*8\*** Cust Item ID:  
 Required Date: 24/02/2012 Req'd Qty: 8.00 **\*8\*** Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: <u>MAT47</u>	0.00							
<b>*130*</b>									
Packaging	Memo	0.00				8	5		
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
<b>*140*</b>									
QC	Memo	0.00							
Quality Control									

M.L.J 12/02/24  
 (5)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

February-10-12 10:06:26 AM

Page 1

Work Order ID: 80116

\*80116\*

Parent Item: D6104-011

\*D6104-011\*

Parent Item Name: 17-4 SS Roundbar 6.50"OD

Start Date: 10/02/2012

Required Date: 24/02/2012

Start Qty: 8.00

Required Qty: 8.00

Comments: IPP A02.12.02New Issue KJ/RF

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-011P		Purchased	No			110	Each	0.0000	1	8			
*D6104-011P*									**				
17-4 SS Roundbar 6.50"OD													

6/24/21 (8)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

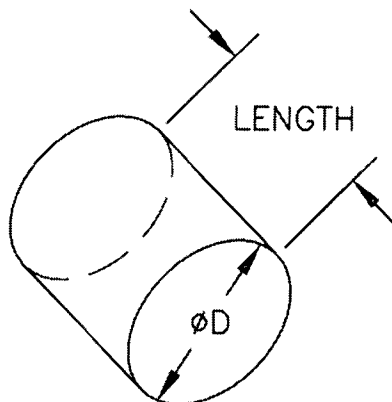


DESIGN ET	DRAWN BY 	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED 	APPROVED 	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4 SCALE NTS	
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29

## SPECIFICATION CONTROL DRAWING



SHOWN COPY  
UNCLASIFIED COPY  
SUB  
NO 80116 M.L.J  
12/02/10

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**Castle Metals®**

A. M. Castle &amp; Co.

## PACKING SLIP

Page 1 of 1

Shipment No: 1192121

<b>Ship From:</b> A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		<b>Sold To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		<b>Ship To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		<b>Deliver To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
<b>Date Shipped</b> 17-FEB-2012	<b>F.O.B.</b> ORIGIN	<b>Freight Terms</b> Prepaid		<b>Carrier</b> MANITOULIN		<b>BOL No</b> 1192121-2	
<b>Shipment Details</b>				<b>Final Destination Branch - MON</b>			

<b>Order No</b> 2004085	<b>Line No</b> 3	<b>Item No</b> 15003.MO	<b>Description</b> 6.5000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.120.0000-168.0000 CUT TO 4.1 IN ( + .1250/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643				
<b>Purchase Order No</b> 16168		<b>Part Number</b> YOUR ITEM NUMBER: D6104-011		<b>Ordered Qty</b> 8.00 PCS		<b>Invoice Qty</b> 8.00 PCS	
<b>Details</b>							
<b>Delivery No.</b> 117372173	<b>Mill</b>	<b>Heat Number</b> G17984	<b>Mech Id</b>	<b>PCS</b> 8	<b>Width (IN)</b>	<b>Length (IN)</b>	<b>Shipped Qty(LBS)</b> 320.36

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Reviewed by Authorized Castle Metals Representative:

Date:

Name:

# SCOT FORGE



8001 Winn Rd., Box 8  
Spring Grove, IL 60061  
847/587-1000  
FAX 847/587-2000

PO # 114416

## MATERIAL CERTIFICATION

H00160 3 SS  
Heat # G17984

Page 1 of 3

<b>S O T F O R G E</b>	CASTLE METALS 1420 KENSINGTON RD, STE 220 Oak Brook, IL 60523	Shipping Information	Material Cert Number
			710573 t1553R0
			Revision Date
			07/21/2011

Item 1 of 1	
Material	Castle Metals Specification 3174-02 Rev 33, ASME SA-564 Type 630 Condition "A" 2010 Edition, ASTM A 564-10 Type 630 Condition "A", AMS 5643R Condition "A", AMS 2303F, UNS# S17400
Heat Treat	per Specification
Destructive Test	per Specification
Finish	Rough Machine with allowance to finish Straightness = 1/8" in 5 FT allowing .063" to .083" stock on diameter
Reference	Access Code: 15003
Size	OD Random Len (inches) 6.5 120 to 156
Surface	500 RMS Saw Cut

Heat Number	# of Pieces	(MILL - UNIVERSAL STAINLESS)
G17984	5	MSDS Previously Sent

Note: Additional prefix letter stamped on product with heat number is for our inventory purposes only and not relevant to heat number.

### Chemical Composition (Wt. %)

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Al	V
0.029	0.84	0.019	0.005	0.25	4.72	15.37	0.24	3.26	<0.01	0.05
Cb	N	Ta	B	Co	Sn	Ti				
0.24	0.021	<0.01	<0.001	<0.05	0.004	<0.01				
Cb+Ta										
0.25										

### Mechanical Properties:

Pcs	Tensile PSI	Yield <sup>1</sup> PSI	Elongation %	Reduction of Area %	Comments
1	193,715	171,591	13.3	39.2	H900 CAP/LONG
<sup>1</sup> (Offset: .2%)					

### Rockwell Hardness Results:

Pcs	Rockwell "C"
1	42

Jerry Glessinger

Corporate Quality Assurance Manager  
This certification has been created and reviewed in  
compliance with the Scot Forge QMS

Note: The recording of false, fictitious or fraudulent  
statements or entries on this document may be  
punishable as a felony under Federal Statute.

# SCOT FORGE



8001 Winn Rd., Box 8  
Spring Grove, IL 60061  
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PO # 114416  
MATERIAL CERTIFICATION


H00160 3 SS  
Heat # G17984

Page 2 of 3

CASTLE METALS

Material Cert Number
710573 t1553R0

Brinell Hardness Results:

Pcs  3000 Kg Load  
5 285/311

Other Testing or Inspections:

Solution anneal at 1900 degrees F for 8 hours  
Age at 900 degrees F for 1 hours

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE UNITED STATES

PIECE TEMP AT START OF SOLUTION ANNEAL: 1900 DEG F

PIECE TEMP AT FINISH OF SOLUTION ANNEAL: 86 DEG F

COOLING METHOD AGE: AIR

16.57:1 FORGING REDUCTION FROM ORIGINAL INGOT

CAST METHOD - INGOT

NO WELD REPAIR PERFORMED

MICRO-EXAM PERFORMED PER AMS 2315; RESULTS 0.02% DELTA  
FERRITE.

MACROETCH PERFORMED PER ASTM E-340/ AMS 5643; RESULTS  
NO PIPE, CRACKS, POROSITY, ETC.

FREQUENCY = .00 SEVERITY = .00 PER AMS 2303


Compliance Statements:

We certify that the material listed was not processed with mercury bearing instruments and/or equipment which might cause contamination, nor was mercury handled in the immediate vicinity during the manufacturing process. We also certify that the material was not processed or cleaned with low melting point materials as alloying constituents, i.e. lead, zinc, cadmium, tin, antimony, bismuth, sulfur, or their compounds.

In accordance with the requirements of the Pressure Equipment Directive, all testing, inspection, and documentation is produced in accordance with EN 10204:2004 Type 3.1 and ISO 10474 Type 3.1.B

Material provided has been produced by Scot Forge under an approved quality program as defined within the Scot Forge QA Manual, Revision 2, Dated 10/05/09.

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Jerry Glessinger  
Corporate Quality Assurance Manager  
This certification has been created and reviewed in  
compliance with the Scot Forge QMS

# SCOT FORGE



8001 Winn Rd., Box 8  
Spring Grove, IL 60061  
847/587-1000  
FAX 847/587-2000

H00160 3 SS  
Heat # G17984

## PO # 114416 MATERIAL CERTIFICATION

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CASTLE METALS

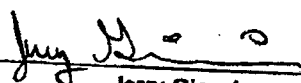
Material Cert Number
710573 t1553R0

### Compliance Statements:

The products supplied are in compliance with the quantity and quality requirements of the purchase order and specifications noted. The test reports represent the actual attributes of the items furnished and the test results are in full compliance with all applicable specifications and order requirements.

CASTLE METALS - CLE	
HEAT NUMBER	G17984
MATERIAL ID	
15003	
923552	
114416	
7-25-11	
Scot Forge	
APPROVED	KB

Note: The recording of false, fictitious or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.

  
Jerry Giessinger  
Corporate Quality Assurance Manager  
This certification has been created and reviewed in  
compliance with the Scot Forge QMS